

REMARKS

1. Claim 1 has been amended to recite “providing in the exhaust stream of an internal combustion engine at least one porous, interdigitated ceramic filter”. Also, four new dependent claims (Claims 8-11) have been added to the listing of the claims.

2. In the Office Action, Claim 1 was rejected under 35 USC 103(a) as being unpatentable over Maunula in view of Buchanan. As noted in the previous response, there is no teaching or suggestion in the Buchanan reference of using syngas to regenerate a NO_x adsorbing material used to treat the exhaust from an internal combustion engine. Further, the Maunula reference contains no teaching or suggestion of how the syngas of Buchanan, which is used to treat flue gases or any other reducing gas could be used in that system to regenerate the NO_x adsorption catalyst.

In the Office Action, the Examiner appears to have discounted the limitation of an “internal combustion engine” since it only appeared explicitly in the preamble. While Applicants disagree with the Examiner’s position that it was not a limitation in the claim, by this paper, claim 1 has been amended to add the “internal combustion engine” limitation into the elements of the claim.

The Examiner asserts it would have been obvious to “use the syngas regeneration of Buchanan in the exhaust purifying method of Maunula because Buchanan discloses the syngas regeneration for use in a process for removing NO_x (title), which permits a reduction in combustion air and temperature, and improves fuel efficiency and NO_x reduction (see column 3, lines 15-21).” Buchanan relates to purifying flue gases generated by a combustor in a plant (e.g., a power plant, a hazardous waste incinerator, or a metallurgical plant). Buchanan discloses the use of a reducing gas, which may be syngas, to regenerate sulfur oxide sorbent beds. With respect to the reduction of nitrogen oxide, the focus in Buchanan is to reduce the amount of nitrogen oxide formed during combustion in the combustor. This is accomplished by decreasing the amount of combustion air (e.g., to 95 to 110 % of the stoichiometric amount to convert all carbon monoxide to carbon dioxide) fed to the combustor which increases the amount of carbon monoxide and minimizes the amount of nitrogen oxide formed (nitrogen oxide formed is an inverse function of the carbon monoxide formed). Buchanan is focused on not generating nitrogen oxide in the first place rather than removing it once generated. Maunula teaches adsorption of nitrogen oxides contained in the exhaust gases of engines operated using on average an excess of oxygen (e.g., $\lambda \geq 1.2$).

With Buchanan focused on not generating nitrogen oxides by decreasing the amount of air and Maunula focused on removing nitrogen oxides generated while using excess oxygen, there is no suggestion or reason to combine the disclosures of Maunula and Buchanan to arrive at the present invention.

Additionally, MPEP 2143 requires that the prior art reference(s) must teach or suggest all the claim limitations. Neither Maunula nor Buchanan teach or suggest a porous, interdigitated ceramic filter including a plurality of inlet channels and a plurality of outlet channels contiguous with said inlet channels. Neither Maunula nor Buchanan teach or suggest using syngas to regenerate a NO_x adsorbing material used to treat the exhaust from an internal combustion engine.

Accordingly, Applicants submit that the claims are patentable over the cited references.

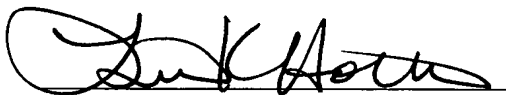
CONCLUSION

Allowance of the claims of the present application is respectfully requested. Should any fee be due in connection with the filing of this document, the Commissioner for Patents is hereby authorized to deduct said fee from Shell Oil Company, Deposit Account No. 19-1800. Should the Examiner find any impediment to the prompt allowance of the claims which could be corrected by telephone interview with Applicant's representative, the Examiner is requested to initiate such an interview with the undersigned.

Respectfully submitted,

KE LIU, WAYNE G. WNUCK, and
JOHN G. BUGLASS

P.O. Box 2463
Houston, Texas 77252-2463


Attorney, Lisa K. Holthus
Registration No. 60,082
(713) 241-5192